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# APPLICATION FOR UNITED STATES LETTERS PATENT

SPECIFICATION

TITLE OF THE INVENTION

APPARATUS AND METHOD FOR CONTROLLING DISPLAY OF DATABASE

SEARCH ITEMS

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BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to an apparatus and method for controlling the display of search items involving a database (inclusive of a display prior to searching the database and a display of search results after searching the database).

Description of the Related Art

Generally a database is created by designing tables constructed within the database and configuring a scheme that is in line with a specific task. Redundancy of data is improved by the structure of such a database.

However, since the scheme conforms to the specific task alone, it is difficult to apply the database to other tasks. The database must be redesigned, therefore, if it is to be applied to another task.

Further, since changes or additions to the names of search items in a database involve changing the database per se, this is inevitably carried out by an expert having thorough knowledge of databases. A user who is not accustomed to handling databases will find difficulty in changing or adding to the names of search items.

DISCLOSURE OF THE INVENTION

Accordingly, an object of the present invention is to arrange it so that even a user not accustomed to handling databases can make changes or additions to the search items of a database in a comparatively simple  
5 manner.

According to the present invention, the foregoing object is attained by providing an apparatus for controlling display of database search items, comprising: a database storing an element-data storage  
10 table in which has been stored, on a field-by-field basis, element data corresponding to the fields, an item-name table which stipulates, field by field, an item name for being made to correspond with a database search-item name, and a display-item designation table  
15 in which display-item data for designating an item name to be displayed on a display unit has been stored; a select-command input unit (select-command input means) for applying a select command for designating a display item; a display-item data read-out unit (display-item  
20 data read-out means) for reading out, from the display-item designation table, the display-item data that conforms to the select command applied by the select-command input unit; an item-name read-out unit (item-name read-out means) for reading out, from the item-name  
25 table, an item name to be displayed on the display unit, the item name being designated by the display-item data read out by the display-item data read-out unit; and a display control unit (display control means) for

The present invention provides also a method  
5 suitable for the apparatus described above.  
Specifically, the present invention provides a method of  
controlling display of search items of a database  
storing an element-data storage table in which has been  
stored, on a field-by-field basis, element data  
10 corresponding to the fields, an item-name table which  
stipulates, field by field, an item name for being made  
to correspond with a database search-item name, and a  
display-item designation table in which display-item  
data for designating an item name to be displayed on a  
15 display unit has been stored, the method comprising the  
steps of: applying a select command for designating a  
display item; reading out, from the display-item  
designation table, the display-item data that conforms  
to the select command applied; reading out, from the  
20 item-name table, an item name to be displayed on the  
display unit, the item name being designated by the  
display-item data read out; and displaying an item name,  
which has been read out, on the display unit as a  
database search-item name.

25        In accordance with the present invention, the above-mentioned element-data storage table, item-name table and display-item designation table are stored in the database. When the select command is applied, the

display-item data conforming to the select command is read out of the display-item designation table. When the display-item data is read out, an item name specified by the display-item data that has been read  
5 out is read out of the item-name table. The item name read out is displayed on the display unit as the name of a search item in the database.

In a case where a database search is conducted, a value corresponding the name of a database search item  
10 displayed on the display unit is entered. Results obtained by the database search are displayed on the display unit.

By entering change-targeted item-name data, which represents a change-targeted item name for changing the  
15 name of an item specified in the item-name table, as well as item-name change data, which represents the name of an item after a change, an item name decided by the entered change-targeted item-name data, which is among the item names specified in the item-name table, is  
20 changed to an item name represented by the item-name change data.

Further, if data representing an additional item name for adding an item name specified in the item-name table is entered, then the additional item name  
25 represented by the entered additional-item-name data will be stored in the item-name table in association with the field.

Thus, by adding or changing an item name that has

been stored in the item-name table, an item name capable of being displayed on the display unit can be added on or changed.

Furthermore, if display-item change data for  
5 changing the display-item data that has been stored in  
the display-item designation table is entered, then the  
display-item data that has been stored in the display-  
item designation table will be changed in accordance  
with the entered display-item change data.

10           Furthermore, by entering display-item add-on data  
for adding on the display-item data that has been stored  
in the display-item designation table, the display-item  
data stored in the display-item designation table will  
be added on in accordance with the entered display-item  
15   add-on data.

An item name displayed on the display unit can be added on or changed.

Data specifying the order in which search items are to be displayed can also be stored in the display-item designation table. This will also make possible a situation in which the order of the search-item display can be changed.

Thus, even a user not accustomed to handling  
databases can change the names of items displayed on the  
25 display unit.

Other features and advantages of the present invention will be apparent from the following description taken in conjunction with the accompanying

drawings, in which like reference characters designate the same or similar parts throughout the figures thereof.

#### BRIEF DESCRIPTION OF THE DRAWINGS

5           Fig. 1 is a block diagram illustrating the electrical construction of a data communication system;

          Fig. 2 illustrates an overview of a page definition table, item-name definition table and general-purpose table that have been stored in a database;

10           Fig. 3 illustrates the details of the general-purpose table;

          Fig. 4 illustrates the details of the item-name definition table before a change;

          Fig. 5 illustrates the details of the page  
15 definition table;

          Fig. 6 illustrates the details of the item-name definition table after a change;

          Figs. 7 to 12 illustrate examples of HTML search pages displayed on the display unit of a client  
20 computer;

          Fig. 13 illustrates the details of the page definition table;

          Figs. 14 to 16 show examples of HTML search pages displayed on the display unit of the client computer;  
25 and

          Fig. 17 is a flowchart illustrating a procedure for displaying a search page.

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

A preferred embodiment of the present invention will now be described in detail with reference to the drawings.

Fig. 1 illustrates a data communication system  
5 according to a preferred embodiment of the present invention.

The data communication system comprises a client computer 1 and a database system 10 capable of communicating with each other via a network such as the  
10 Internet. The client computer 1 includes a display unit, and the database system 10 includes a Web server 11. The Web server 11 includes a CPU, a memory, a CD-ROM drive, a display unit and so on.

The database system 10 further includes an HTML  
15 (HyperText Markup Language) template storage unit 16 in which data representing a template for displaying an HTML search page has been stored; a database 15 for storing various data; a database controller 14 for searching various data that has been stored in the  
20 database 15; a search-page generating unit 13 for generating the HTML page data (inclusive of a page for inputting search criteria, a page for displaying search results and a page for inputting data to the database); and a controller 12 for controlling the overall  
25 operation of the database system 10.

A general-purpose table (element-data storage table), item-name definition table (item-name table) and page definition table (display-item designation table)

have been stored in the database 15, as will be described later. In order to change the content of each table stored in the database 15, a customizing tool (constituted by a computer, keyboard, mouse and monitor, etc.) 21 has been connected to the database system 10.

Though the database system 10 and customizing tool 21 are illustrated as being implemented by hardware in Fig. 1, software implementation may be adopted as necessary.

Fig. 2 illustrates an overview of the tables that have been stored in the database 15 included in database system 10.

The database 15 stores the general-purpose table, item-name definition table and page definition table, as mentioned above.

Element data, which is data that is the object of a search, has been stored in the general-purpose table per character data string, numeric data string and date data string. The character data string, numeric data string and date data string are of numerous types and element data composed of a character string, element data composed of numerals and element data composed of dates is stored in the table in conformity with the type of data string. Data numbers are also stored in the general-purpose table in order to identify the element data.

An item-name number, search-item name and field name have been stored in the item-name definition table.

The search-item name is an item name displayed on the database search page, and the item-name number is a number for identifying a search-item name. The field name is for specifying a character data string, numeric data string and date data string that have been stored in the general-purpose table. The item-name definition table and general-purpose table are associated with each other by the field name.

A page number, page name, item-name number, order of the items and display type have been stored in the page definition table. The page number specifies the search page to be displayed. The page name indicates the name of the search page to be displayed. The order of the items indicates the order in which the search items are displayed on an HTML search page. The display type indicates the display type of a search item displayed on the HTML search page.

The page definition table and the item-name definition table area associated with each other by the item-name number.

Fig. 3 illustrates the details of the general-purpose table.

For each string (field) specified by a field name (character data strings 1, 2, ..., 14, 15, numeric data strings 1, ..., 10 and date string 1, etc.), element data corresponding to the string has been stored in the general-purpose table. Element data (printer, monitor, cable, camera, etc.) corresponding to product category

has been stored in character data string 1. Element data (C-300D, DN40T, AB-100, C-123, etc.) corresponding to a product name has been stored in character data string 2. Element data (AAA Electric Co., BBB Monitor Co., EE Media Co., FF Electronics Co., etc.) corresponding to a manufacturer name has been stored in character data string 14. Element data (TA system, flat panel, megapixel, etc.) corresponding to product features has been stored in the character data string 15. Element data (18000, 43000, etc.) corresponding to the weight of a product has been stored in the numeric data string 1. Element data (15600, 7200, etc.) corresponding to the number of the items of a product in stock has been stored in the numeric data string 10. Element data (1997/4/8, 1998/1/19, etc.) corresponding to the sales date of a product has been stored in the date data string 1.

The set of the items of element data on one line is identified by the data number.

Fig. 4 shows the details of the item-name definition table. A search item capable of being displayed on an HTML search page is stipulated by this item-name definition table.

An item name has been assigned in correspondence with each field name. Since element data indicating product category has been stored in the character data string 1 of the general-purpose table, as mentioned above, "PRODUCT CATEGORY" has been assigned as the item

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MANUFACTURING COMPANY", and the item name stipulated by item name number 11 has been changed from "WEIGHT" to "POUNDAGE". As a result, the HTML search page shown in Fig. 8 also is such that the search items displayed in the search-item display area A1 have changed from "PRODUCT CATEGORY" to "PRODUCT CLASS", from "MANUFACTURER NAME" to "NAME OF MANUFACTURING COMPANY" and from "WEIGHT" to "POUNDAGE".

Thus, by changing the item names contained in the item-name definition table, the search items displayed on the HTML search page are changed.

Fig. 9 illustrates an example of an HTML search page specified by page number 2 (Page Name: ROOT/Entry). This diagram is an HTML search page displayed on the display unit of the client computer 1 when each item of data is registered with the database 15.

The HTML search page shown in Fig. 9 includes the following areas:

Search-item display area A5:

This area displays search items for setting data; it includes area for entering setting data as well.

Image display area A6:

This is an area which displays an image representing a product.

Image selection area A7:

This area is clicked by the user of the client computer 1 when an image displayed in the image display

Registration area A8:

5 search-item display area A5 is registered with the  
database 15.

10 definition table shown in Fig. 4 to the item-name  
definition table shown in Fig. 6, the HTML search page  
shown in Fig. 9 becomes the HTML search page shown in  
Fig. 10, and the search items displayed in the search-  
item display area A5 and the order of arrangement  
15 thereof change.

when data obtained by searching the database 15 is displayed on the display unit of the client computer 1.

20           This HTML search page includes the following areas:

Group keyword input area A21:

This is an area in which a group keyword is entered in a case where a search of the database 15 is conducted by applying a group keyword.

25            Grouping area A22:

This is an area clicked by the user of the client computer 1 when a command to search the database 15 is applied to the database system 10 by providing a group

keyword.

Search-result display area A10:

This is an area in which search results obtained by searching the database 15 are displayed item name by item name. The items displayed in search-result display area A10 also are stipulated by the item-name definition table. The item names displayed in the search-result display area A10 are changed by changing the item names in the item-name definition table.

10           Page display area A31:

This area indicates the number of the HTML search page being displayed.

Single-page advance area A32:

When an HTML search page being displayed is to be  
15 advanced by one page, this area is clicked by the user  
of the client computer 1.

## Plural-page advance area A33:

When an HTML search page being displayed is to be advanced by a plurality of pages, this area is clicked  
20 by the user of the client computer 1.

Single-page return area A34:

When an HTML search page being displayed is to be turned back by one page, this area is clicked by the user of the client computer 1.

25 Plural-page return area A35:

When an HTML search page being displayed is to be turned back by a plurality of pages, this area is clicked by the user of the client computer 1.

By changing the names of items in the item-name definition table, the search items being displayed in the search-result display area A10 shown in Fig. 11 are changed in the manner shown in Fig. 12.

5        Fig. 13 illustrates an example of the page definition table.

In comparison with the page definition table illustrated in Fig. 5, the page definition table shown in Fig. 13 is such that the page number, page name,  
10        order of the item name and display type specified by the item-name number 24 have been deleted. The order of the items also has been changed.

By changing the page definition table from that shown in Fig. 4 to that shown in Fig. 13, the search  
15        item "SALES DATE" stipulated by item-name number 24 is deleted from the search items included on the HTML search page shown in Fig. 7 specified by page number 1, as illustrated in Fig. 14.

Further, the order in which the items are arranged  
20        is changed so that the new order is "PRODUCT NAME", "MANUFACTURER NAME", "PRODUCT CATEGORY", "PRODUCT FEATURE" and "WEIGHT" decided by the page definition table of Fig. 13.

The search item "SALES DATE" stipulated by item-  
25        name number 24 is deleted also from the HTML search page shown in Fig. 9 specified by page number 2, as illustrated in Fig. 15. The order in which the items are arranged also is changed so that the new order is

[illegible]

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First, a request to display a search page is transmitted from the client computer 1 to the database

10           Further, the controller 12 applies a search-item  
request command to the database controller 14 via the  
search-page generating unit 13 (step 34). The item-name  
definition table and the page definition table are  
searched in accordance with the search-item request  
15 command (step 35). The search items to be displayed on  
the HTML search page are extracted from the database 15  
by the database controller 14 (step 36).

Thus, as described above, HTML search pages of the

kind shown in Figs. 9 to 12 and Figs. 14 to 16 are displayed on the display unit of the client computer 1. Thus, even a user not accustomed to handling databases is capable of changing search display items.

5           As many apparently widely different embodiments of  
the present invention can be made without departing from  
the spirit and scope thereof, it is to be understood  
that the invention is not limited to the specific  
embodiments thereof except as defined in the appended  
10 claims.